

## CLAIMS

1. Reactor (1) for carrying out exothermic or endothermic heterogeneous reactions comprising:

- an outer shell (2) of substantially cylindrical shape;

- 5 - at least a heat exchanger (9) embedded in a catalytic layer (10) supported into said shell (2);

characterised in that:

- said heat exchanger (9) is a plate (14) heat exchanger.

- 10 2. Reactor (1) according to claim 1, characterised in that said plates (14) of said exchanger (9) comprise ducts (14a) extending parallel to the axis of said shell (2).

- 15 3. Reactor (1) according to claim 2, characterised in that said plates (14) of said exchanger (9) comprise respective mutually juxtaposed walls (14', 14'') which define between them said ducts (14a) extending parallel to the axis of said shell (2).

- 20 4. Reactor (1) according to claim 2, characterised in that said shell (2) supports a plurality of said heat exchangers (9) in fluid communication with a feed duct (6) of a heat exchange fluid.

5. Reactor (1) according to claim 2, characterised in that it comprises anchoring means (18, 91) of at least one of said exchangers (9).

- 25 6. Reactor (1) according to claim 1, characterised in that said plates (14) of said exchanger (9) comprise ducts (14a) extending perpendicularly to the axis of said shell (2).

- 30 7. Reactor (1) according to claim 6, characterised in that said plates (14) of said exchanger (9) comprise respective mutually juxtaposed walls (14', 14'') which define between them said ducts (14a) extending perpendicularly to the axis of said shell (2).

8. Reactor (1) according to claim 6, characterised in that said shell (2) supports a plurality of said heat exchangers (9) in fluid communication with a feed duct (6) of a heat exchange fluid.

- 5 9. Reactor (1) according to claim 6, characterised in that said heat exchangers (9) are arranged radially in said catalytic layer (10).

10. Reactor (1) according to claim 6, characterised in that it comprises anchoring means (18, 91) of at least one of  
10 said exchangers (9).

11. Method for the manufacture of a reactor (1) for carrying out endothermic or exothermic heterogeneous reactions comprising the steps of:

- 15 - recovering a substantially cylindrical shell of an existing reactor;  
- arranging at least a catalytic layer (10) inside said recovered shell;  
- arranging at least a plate heat exchanger (9) according to any one of the preceding claims, in said at least one  
20 catalytic layer (10).